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American Standard
SPECIFICATIONS
FOR INDUSTRIAL
ACCIDENT PREVENTION
SIGNS

APPROVED

American Standards Association

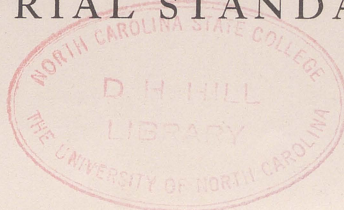
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FOREWORD

These specifications were formulated according to the procedure of the American Standards Association, under the administrative leadership of the National Safety Council, and with the following scope:

“Design, application and use of warning signs or symbols (other than slogans) intended to indicate, and in so far as possible, to define specific hazards of a nature such that failure to so designate them may cause, or tend to cause, accidental injury to workers, or the public, or both.”

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*W. P. Biggs, deceased, served as alternate representative of the U. S. Navy Department during the development of these specifications.

AMERICAN STANDARD SPECIFICATIONS FOR INDUSTRIAL ACCIDENT PREVENTION SIGNS

INTRODUCTION

Accident prevention signs have probably been used for a longer period of time than any other item of safety equipment. That constructive thought has previously been given to accident prevention signs is shown by the following paragraph taken from *Signs and Slogans*, a booklet published by the Independence Inspection Bureau in 1914:

"You can't always apply mechanical safeguards. Nor can you be present always to caution men of danger. Signs will help you. Use substantial signs—place them properly—and maintain them in good condition."

Also, in the booklet *Universal Safety Standards*, published in the same year, there appeared a section "Standards for Danger and Safety Signs" which basically was much the same as the specifications here presented.

Proper signs, intelligently used, have been effective and can be made still more so in preventing accidents. That there is a definite need for signs in industrial safety is obvious. Their use wherever safety programs are being carried out indicates their accepted value. An important function of accident prevention signs is to warn persons against committing unsafe acts.

It is reasonable to expect that for maximum safety, reaction to signs should be automatic and it should not be necessary to stop, read, and analyze the meaning of each particular warning. Reaction to signs will become automatic if certain types of signs are posted for certain purposes. Also, persons who cannot read English will learn to recognize and be warned by standard sign designs and colors.

Sign uniformity is of great importance. When various concerns in either the same or different industries all use signs of definite de-

sign and color to warn of particular hazards, to express caution, to provide general information, or to point out directions, the use of accident prevention signs will be considerably more effective. Such practice will result in workers becoming familiar with the few necessary sign designs, no matter where they work, and confusion with unfamiliar signs will be avoided. Such uniformity will be important also from the viewpoint of workers who are color blind, as, even though they may not be able to distinguish readily between colors, they will be able to realize the significance of familiar designs.

How much credit should be given to the use of signs in the reduction of accidents, it is impossible to determine. When a worker's eyes are saved because he was wearing goggles, the injury was undoubtedly prevented because of the goggles. However, the goggles may have been worn because of a sign making a recommendation or a demand, such as, "Wear Goggles When Operating This Machine." Undoubtedly, many fires and explosions have been prevented because of "No Smoking" signs. Many other accidents have been prevented when workers have paid attention to safety warnings brought to them by accident prevention signs.

It should be clearly understood, however, that signs are not to be considered the only steps to be taken against particular hazards. Whenever possible, the hazards should be eliminated. Safeguards should be used although in many instances, even after safeguards have been installed, signs may be posted as an added precaution.

Tags, portable tripods, flare pots, danger flags and other devices used in lieu of signs were given consideration and it was decided at the Sectional Committee meeting of October 19, 1939, that the committee finish its work on signs at the earliest possible date, but give consideration to such devices in a future revision of these specifications, holding the present Sectional Committee in-

tact for this purpose. It was voted that mention be made of this fact in the present edition of these specifications. The Sectional Committee recommends further that the design, construction, and use of such devices produced in the interim be consistent with the principles of these specifications, as far as practical.

SECTION 1

SCOPE AND PURPOSE

1.1 SCOPE

1.11 These specifications apply to design, application, and use of signs or symbols (as included in Sections 2 to 6 inclusive) intended to indicate and, insofar as possible, to define specific hazards of a nature such that failure to designate them may lead to accidental injury to workers, or the public, or both.

1.12 These specifications are intended to cover all safety signs except those designed for street, highway, railroad, and marine regulations.* Neither do these specifications apply to plant bulletin boards nor to safety posters.

1.2 PURPOSE

1.21 It is the purpose of these specifications to eliminate as far as possible the indiscriminate posting of haphazardly selected signs, and to have installed signs of certain designs for definite purposes.

1.22 It is not intended that all accident prevention signs in use at the time of approval of these specifications should be replaced immediately with standard signs. All new signs and replacements of old signs should be designed and constructed in accordance with these specifications.

SECTION 2

DEFINITIONS

2.1 The word "sign" as used in these specifications refers to a surface on which letters or

* For signs pertaining to railroad and marine regulations, reference should be made to the Interstate Commerce Commission, the United States War Department, and the Bureau of Marine Inspection, all of Washington, D. C.

other markings appear, prepared for the warning or safety instruction of industrial workers or members of the public who may be exposed to the hazards or regulations of industrial operations. Excluded from this definition, however, are news releases, or displays, commonly known as safety posters or bulletins used for employee education. (Such posters or bulletins, however, should not be in violation of the principles of these specifications.)

2.2 The word "shall" is to be understood as mandatory.

2.3 The word "should" is to be understood as advisory.

2.4 The word "approved" means approved by the authority having jurisdiction.

SECTION 3

REFERENCES TO OTHER CODES

3.1 These specifications are supplemented by the following codes* approved by the American Standards Association:

Building Exits Code, A9-1940

Manual on Uniform Traffic Control Devices for Streets and Highways, D6-1935

Safety Code for Colors for Traffic Signals, D3-1927

SECTION 4

SIGN PURPOSES

4.1 Uniformity shall be maintained for the following purposes:

- (a) *Danger* signs — to warn of specific dangers only.
- (b) *Caution* signs — to warn of possible dangers or unsafe practices.
- (c) *Safety Instruction* signs — to provide information relating to general safe practices.
- (d) *Directional* signs — to indicate the way to stairways, fire escapes, exits, and other locations.

* Copies of these codes may be obtained from the American Standards Association, 29 West 39th Street, New York, N. Y.

- (e) *Informational* signs—to carry messages of a general nature, such as rules, regulations, and markers, when such postings do not conflict with Danger or Caution purposes.

SECTION 5 SIGN COLORS

5.1 REQUIRED COLORS

5.11 A sign shall have sufficient of its assigned color in its make-up so that it will be the predominating color of the sign. The following colors shall be used:

- (a) Danger signs — Red
- (b) Caution signs — Yellow
- (c) Safety instruction signs — Green
- (d) Directional signs—Black (see 6.4)
- (e) Information signs (see 6.5)

5.2 COLOR SPECIFICATIONS

5.21 The colors red, yellow, and green shall be those of opaque glossy samples which, when measured under the conditions stated in paragraph 5.22, (a) to (d) conform to the following table:

	Trichromatic coefficients			Daylight
	<i>x</i>	<i>y</i>	<i>z</i>	Reflectance
				Per cent
Red:				
Standard	0.654	0.318	0.028	7.3
Minimum	*	0.315	*	6.7
Maximum	*	0.320	0.030	*
Yellow:				
Standard	0.481	0.486	0.033	55.
Minimum	*	0.973 x	*	50.
Maximum	*	1.049 x	0.040	*
Green:				
Standard	0.268	0.507	0.225	7.1
Minimum	0.400-2.283 y	0.500	*	5.5
Maximum	0.280	*	*	*

5.22 The conditions of measurement shall be as follows:

(a) The observer, and the coordinate system for the trichromatic coefficients, shall be the 1931 standard of the International Commission on Illumination (ICI).

(b) The illuminant shall be the ICI illuminant C (representative of average daylight).

* No limit. Whatever is feasible in meeting the other limitations is permissible, since $x + y + z = 1$.

(c) The standard of reflectance shall be a surface of fresh magnesium oxide.

(d) Illumination shall be at an angle of 45 deg, and observation shall be made normal to the surface.

SECTION 6 SIGN DESIGN

6.1 DANGER SIGNS

6.11 Danger signs shall have a WHITE background covering the face of the sign. The word DANGER shall appear in WHITE letters on a RED oval. The red oval should be placed inside a BLACK rectangular panel with a WHITE line separating the outside edge of the red oval from the adjacent edge of the black panel.

6.12 The danger panel should be placed at the top of the sign.

6.13 The sign wording should be in black letters on the white background.

6.14 The size of the red oval containing the word "Danger" and the size of the letters used for the word "Danger" should vary with the outside dimensions of the sign. (See Appendix D, page 16.)

6.15 The sign wording or message should be as brief as possible but, at the same time, convey all necessary information. The expression may include what the danger is, where it is, or, in some cases, how to avoid it.

6.2 CAUTION SIGNS

6.21 Caution signs shall have a YELLOW background covering the face of the sign. The word CAUTION shall appear in YELLOW letters on a black rectangular panel.*

6.22 The caution panel should be placed at the top of the sign.

* In some instances, it may be difficult to determine whether a certain sign message should be placed on a danger sign or a caution sign. If the distinction is not clear, use the danger sign.

6.23 The sign wording should be in black letters on the yellow background.

6.24 The size of the black rectangular panel containing the word "Caution" and the size of the letters used for the word "Caution" should vary with the outside dimensions of the sign. (See Appendix D, page 16.)

6.3 SAFETY INSTRUCTION SIGNS

6.31 Safety instruction signs should have a white background covering the face of the sign. If words such as "Think" or "Be Careful" are used, they should be in white letters on a green rectangular panel.

6.32 The green panel should be placed at the top of the sign. The sign wording should be placed below the panel in black letters on the white background.

6.33 The size of the green panel and the size of letters for the word or words should vary with the outside dimensions of the sign. (See Appendix D, page 16.)

6.4 DIRECTIONAL SIGNS

6.41 Directional signs should have a white background covering the face of the sign. The arrow pointing out the direction should be in white on a black rectangular panel. Any wording in the arrow or below the panel should be in black. (An exception is found in the Building Exits Code, A9-1940. See 6.44.)

6.42 The black panel should be placed at the top of the sign.

6.43 The size of the panel and of the arrow should vary with the outside dimensions of the sign. (See Appendix D.)

6.44 EXIT SIGNS. Exit signs shall have white letters on a green field or, for internally illuminated types, green letters of translucent material on an opaque field. Minimum dimensions for the word "Exit" shall be 6 inches in height and $\frac{3}{4}$ inch in width for the principal strokes of the letters. (See Building Exits Code, A9-1940.)

6.5 INFORMATIONAL SIGNS

6.51 Informational signs may be in any of a variety of designs and colors, except that neither red nor yellow shall be used.

6.52 MARKER SIGNS. Signs are used frequently to designate certain locations such as offices, entrances, and toilets. These signs may be of any convenient size and of any desired design except that they shall be distinct from any of the special groupings listed elsewhere in these specifications.

6.6 SYMBOLS

6.61 Symbols used on signs shall follow recognized practices, such as:

Poison—Skull and cross bones

Electricity—A zigzag line indicating a lightning flash

APPENDICES

APPENDIX A

SIGN USES

A1 DANGER SIGNS

(a) Danger signs should be used only where an immediate hazard exists. There should be no variation in the type or design of signs posted to warn of specific dangers.

(b) All employees should be instructed that danger signs indicate immediate danger and that special precautions are necessary.

A2 CAUTION SIGNS

(a) Caution signs should be used only to warn against potential hazards or to caution against unsafe practices.

(b) All employees should be instructed that caution signs indicate a possible hazard against which proper precautions should be taken.

A3 SAFETY INSTRUCTION SIGNS

Safety instruction signs should be used

where there is a need for general instructions and suggestions relative to safety measures.

A4 DIRECTIONAL SIGNS

Directional signs in sufficient numbers should be so used as to indicate the way to locations such as exits, fire escapes, stairways, and first aid rooms.

(For exit signs, see Section 1205 of the Building Exits Code, A9-1940.)

A5 INFORMATIONAL SIGNS

Informational signs should be used where it is advisable to convey general information on subjects not necessarily of a safety nature, but by their use tend to avoid confusion and misunderstandings. Signs such as those marking toilets, offices, entrances, and locker rooms fall into this classification.

APPENDIX B

SIGN WORDINGS

B1 EXAMPLES OF WORDINGS

The following lists contain examples of wordings that have been used in signs of various types. They are intended to serve as a guide for choosing the correct sign design for the message to be displayed. (See notes under 6.24 and B7.)

B2 NATURE OF WORDING

The wording of any sign should be easily read and concise, but it should contain sufficient information to be easily understood. The wording should, whenever possible, afford a positive, rather than a negative, suggestion and should be accurate in fact.

B3 DANGER SIGNS

Danger—High Voltage
 Danger—Keep Off, Electric Current
 Danger—No Smoking, Matches or
 Open Lights
 Danger—Men Working Above

Danger—Not Room Enough Here to
 Clear Man on Cars
 Danger—Keep Away
 Danger—Keep Off, Explosives
 Danger—Man in Boiler
 Danger—Insufficient Clearance
 Danger—2,300 Volts
 Danger—Keep Out
 Danger—Crane Overhead
 Danger—Keep Off
 Danger—Use No Open Lights—Flam-
 mable

B4 CAUTION SIGNS

Caution—Do Not Operate, Man Work-
 ing on Repairs
 Caution—Hands Off Switch, Man
 Working on Line
 Caution—Working on Machines, Do
 Not Start

Caution—Goggles Must Be Worn
When Operating This Machine

Caution—This Door Must be Kept
Closed

Caution—Electric Trucks, Go Slow

Caution—This Space Must Be Kept
Clear At All Times

Caution—Stop Machinery to Clean, Oil
or Repair

Caution—Keep Aisles Clear

Caution—Operators of This Machine
Shall Wear Snug Fitting Clothing—
No Gloves

Caution—Close Clearance

Caution—Watch Your Step

Caution—Electric Fence

B5 SAFETY INSTRUCTION SIGNS

Report All Injuries to the First Aid
Room At Once

Walk—Don't Run

Report All Injuries No Matter How
Slight

Think, If Safe Go Ahead

Make Your Work Place Safe Before
Starting the Job

Report All Unsafe Conditions to Your
Foreman

Help Keep This Plant Safe and Clean

B6 DIRECTIONAL SIGNS

This Way Out (below arrow panel)

This Way (inside arrow) Out (below
arrow panel)

Fire Exit (below arrow panel)

Fire (inside arrow) Extinguisher (be-
low arrow panel)

To The (inside arrow) Fire Escape
(below arrow panel)

To The (inside arrow) First Aid (be-
low arrow panel)

Manway (below arrow panel)

This Way To (inside arrow) First Aid
Room (below arrow panel)

B7 INFORMATIONAL SIGNS

No Trespassing Under Penalty of the
Law

This Elevator Is For Freight Only Not
For Passengers

No Admittance Except to Employees on
Duty

No Admittance

No Admittance, Apply at Office

No Trespassing

Men

Women

For Employees Only

Office

Employment Office

Informational signs with longer wordings
are also sometimes used, such as:

Suggestions that will promote employee
welfare and plant efficiency are invited.
Due credit will be given for all sugges-
tions approved. Write them down and
drop in the suggestion box.

Notice to Those Seeking Employment.
Unless you are willing to be careful to
avoid injury to yourself and others do not
ask for employment here. We want only
careful employees.

(NOTE: When sign wordings such as those
listed in this appendix are contemplated, care
should be taken to be sure that they are suitable
for the particular location at which the sign is
to be placed and that the wording meets the re-
quirement of the intended purpose. When there
is a reasonable doubt, a sign of a standard
design should be used.)

APPENDIX C

SIGN MAINTENANCE

C1 SIGN INSPECTION

Signs should be inspected regularly and kept clean, well illuminated and legible. Dam-
maintained in good condition. They should be aged or broken signs should be replaced.

APPENDIX D DESIGN SIZES

D1 LOCATION

The size of a sign should be determined by the location at which the sign is to be placed, the character of the hazard involved, the purpose of the sign, the distance at which the sign should be legible, and the amount of wording the sign is to contain.

NOTE: The determination of sign sizes for any particular use will not be difficult when the above factors are considered. For example, a sign to be placed over a grinding wheel, warning the operator to wear goggles, will not need to be large, as its message is but to one person

at a time, and the interested person will be standing close to the sign. Signs warning of no clearance on the top or side of cars, however, will need to be larger because of the greater distances from which they must be read.

D2 DIMENSIONS

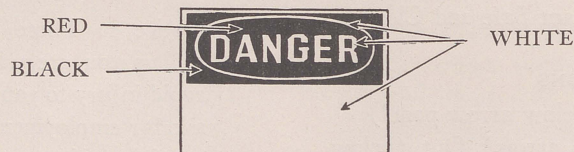
When choosing a sign size, consideration should be given to dimensions that will permit economic use of standard sized materials.

D3 SIZE DATA

The following tables provide data from which signs of good proportions can be made:

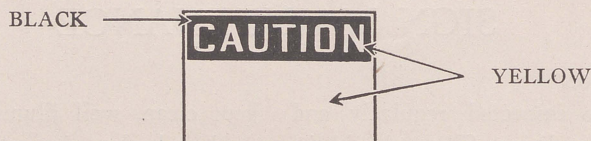
(a) DANGER SIGNS

Sign Size, Inches Hght Width	Black Rectangular Panel, Inches Hght Width	Red Oval, Inches Hght Width	Word Danger Hght Inches	Maximum Space Available for Sign Wording, Inches Hght Width
HORIZONTAL PATTERN				
7 x 10	3¼ x 9¾	2⅞ x 8½	1¼	2¾ x 9¾
10 x 14	4⅝ x 13¾	4⅞ x 11⅞	2¼	4¼ x 13¾
14 x 20	6½ x 19¾	5¾ x 17	2⅞	6¼ x 19¾
20 x 28	9¼ x 27¾	8¼ x 23⅞	4⅞	9½ x 27¾
UPRIGHT PATTERN				
10 x 7	2⅜ x 6¾	2⅞ x 5⅞	1¼	6⅜ x 6¾
14 x 10	3¼ x 9¾	2⅞ x 8½	1¼	9½ x 9¾
20 x 14	4⅝ x 13¾	4⅞ x 11⅞	2¼	14 x 13¾
28 x 20	6½ x 19¾	5¾ x 17	2⅞	20¼ x 19¾



(b) CAUTION SIGNS

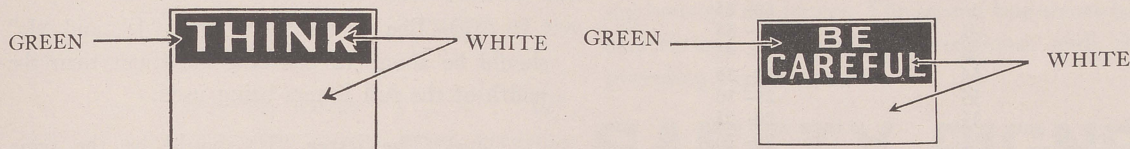
Sign Size Inches Hght Width	Black Rectangular Panel, Inches Hght Width	Word "Caution" Height of Letters Inches	Max. Space Available for Sign Wording Below Panel Inches Hght Width	Sign Size Inches Hght Width	Black Rectangular Panel, Inches Hght Width	Word "Caution" Height of Letters Inches	Max. Space Available for Sign Wording Below Panel Inches Hght Width
HORIZONTAL PATTERN				UPRIGHT PATTERN			
7 x 10	2¼ x 9¾	1⅞	3¼ x 9¾	10 x 7	1⅞ x 6¾	1⅞	7 x 6¾
10 x 14	3¼ x 13¾	2¼	5½ x 13¾	14 x 10	2¼ x 9¾	1⅞	10½ x 9¾
14 x 20	3¾ x 19¾	2¾	9 x 19¾	20 x 14	3¼ x 13¾	2¼	15½ x 13¾
20 x 28	4¼ x 27¾	3¼	14½ x 27¾	28 x 20	3¾ x 19¾	2¾	24 x 19¾



(c) SAFETY INSTRUCTION SIGNS

Sign Size, Inches Hght Width	Green Rectangular Panel, Inches Hght Width	Word "Think" Height of Letters Inches	Max. Space Available for Sign Wording Below Panel, Inches	
			Hght	Width
7 x 10	2¼ x 9¾	1½	3½ x	9¾
10 x 14	3¼ x 13¾	2¼	5½ x	13¾
14 x 20	3¾ x 19¾	2¾	9 x	19¾
20 x 28	4¼ x 27¾	3¼	14½ x	27¾

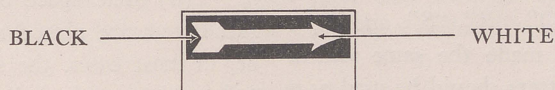
Sign Size Inches Hght Width	Green Panel Inches Hght Width	Word "Be" Hght of Letters Inches	Word "Careful" Hght of Letters Inches	Max. Space Available for Sign Wording Below Panel Inches	
				Hght	Width
7 x 10	3¾ x 9¾	1¼	1½	2½ x	9¾
10 x 14	4¾ x 13¾	1¾	2½	4 x	13¾
14 x 20	6¾ x 19¾	2½	3½	6 x	19¾
20 x 28	9½ x 27¾	3½	4¾	9¼ x	27¾



(NOTE: The words "Think" and "Be Careful" as given here, are only illustrations. Other wordings may be used.)

(d) DIRECTIONAL SIGNS

Sign Size Inches Hght Width	Black Rectangular Panel, Inches Hght Width	White Arrow Inches				Maximum Space for Sign Wording Below Panel Hght
		Overall Length	Arrow Head Hght Width	Arrow Shaft Hght	Arrow Tail Hght Width	
6½ x 14	3¼ x 13¾	12¾	2¾ x 3	1½	2¾ x 3¼	2¼ x 13¾
9 x 20	4½ x 19¾	18¾	3¾ x 4½	1½	3¼ x 4½	3¾ x 19¾
12 x 28	6 x 27¾	26¾	5½ x 5½	2½	4¾ x 6	4¾ x 27¾
15 x 36	7½ x 35¾	34¾	6¾ x 6¾	2¾	5½ x 7½	6¼ x 35¾



APPENDIX E

SIZES OF SIGNS AND SIGN LETTERING

E1 BALANCE AND LEGIBILITY

The size lettering to be used for the sign wording or message should be as large as possible but consistent with good balance and legibility.

E2 TYPE OF LETTER

The block type letter should be used because it is more easily read and requires less vari-

ance in eye efficiency for the different letters in the alphabet than most other types of letter faces.

E3 WORDING AND SPACE

Letter sizes will necessarily depend upon the amount of wording and the amount of space available for the sign message. The following table shows the distances at which well propor-

tioned letters of different heights can be read by persons of normal vision, under good lighting conditions:

Height of Letters Inches	Distance Visible* Feet
3½	200-210
3	170-180
2½	140-150
2	110-120
1¾	95-105
1½	80- 90
1¼	70- 80
1	60- 65
¾	50- 55
¾	40- 45
⅝	30- 35
½	25- 30
⅜	20- 25
¼	15- 20

* Distances specified do not include any allowance for various color combinations.

E4 LAY-OUT

It is impossible to provide definite recommendations as to how to lay out the letters contained in a sign message so as to produce the best possible sign from the standpoint of visibility and legibility. There are too many exceptions that can be considered only at the time the sign is being prepared. However, the following suggestions will assist in the forming of well proportioned letters.

(a) Certain letters of the alphabet are known as full letters. These are, "B", "C", "D", "G", "K", "O", "P", "Q", "R", "S", and "T". All full letters may be made the same width. The width of the full letters should be used as a basis for determining the width of the other letters.

(b) A well proportioned full letter can be made if its width is 25 per cent less than its height. The full vertical stroke of all letters should be about 80 per cent less in width than the height of the letters. The full horizontal stroke of all letters should be about 25 per cent less in width than the width of the vertical stroke. For example, the letter "T" if made 2½ inches high would be 1⅞ inches wide, have a vertical stroke ½ inch wide and a horizontal stroke ¾ inch wide.

(c) The letter "W" should be about 50

per cent wider than the width of the full letters being used.

(d) The letters "A", "M", "V", "Y", and "Z" should be about 20 per cent wider than the width of the full letters being used.

(e) The letters "H", "N", and "U" should be about 10 per cent narrower than the width of the full letters being used.

(f) The letters "E", "F", "J", and "L" should be about 15 per cent narrower than the width of the full letters being used.

(g) The letter "I" should be the same width as the width of the full vertical stroke being used.

(h) Particular attention should be given to the openings in such letters as "A", "B", "D", "O", and "P". If the openings are made too small the letters will be difficult to read.

E5 SPACING

The spacing between letters is important. Letters should never be crowded together, neither should there be too much space. The following suggestions will provide well balanced letter spacing:

(a) The space between full letters when full letters are placed next to each other should be, in most cases, the same as the width of the full vertical stroke being used.

(b) When the letter "E" is used with a full letter, such as "ED", the space between the letters should be about 25 per cent less than the width of the full vertical stroke being used.

(c) When the letter "F" is used with a full letter, such as "FR", the space between the letters should be about 30 per cent less than the width of the full vertical stroke being used.

(d) When the letters "A", "J", "K", "L", "V", "W", "X", "Y", and "Z", are used with full letters or letters having a full vertical stroke, such as "AB", "AJ", "KD", and "VE", the space between the letters should be about 75 per cent

less than the width of the full vertical stroke being used.

(e) When the letter "J" is followed by a letter having a full vertical stroke, such as "JU", the space between the letters should be the same as the width of the full vertical stroke being used.

(f) When the letters "K" and "L" are preceded by a letter having a full vertical stroke, such as "NK" or "UL", the space between the letters should be the same as the width of the vertical stroke being used.

(g) When the letters "T", "V", "W", and "Y" are preceded by any letter, excepting "A", "X", and "Y", and also when followed by "T", "V", "W", or "Y", such as "ETY", "ITY", "ITT", and "FEW", the space between the first two letters should be about 50 per cent less than the width of the full vertical stroke being used.

(h) When the letters "A" and "V", "A" and "W", "A" and "Y" appear together such as "AV", "WA", and "AY", the space between the letters should be the width of the full vertical stroke, measured from the center of the adjacent slanting strokes.

(i) When the letter "L" is followed by "T", "V", "W", and "Y", such as "LT" and "LY", the space between the letters should be

the same as the width of the full vertical stroke being used measured from the vertical stroke of the "L" to the adjacent edge of the letter that follows.

E6 EXAMPLES

The following example shows how letters appear when correctly and incorrectly formed and spaced. The first line shows letters all the same height and width and with the same spacing between the letters. The second line shows letters formed and spaced in accordance with the preceding suggestions.

SAFETY SIGNS

(a) Note the small opening in the letter "A", also how the letters "F", "E" and "N" appear larger than the other letters and how the letters "A" and "Y" appear smaller, although all letters are the same width. Notice how some of the letters appear to be greatly separated from the other letters although the spacing between all letters is the same.

SAFETY SIGNS

(b) Note how all letters appear to be the same size although they are not; also how the spacing appears to be uniform.

APPENDIX F

SIGN CONSTRUCTION, MATERIALS AND FINISHES

F1 SHEET METAL SIGNS

The main factors to be considered in choosing the gage of sheet metal for a sign are the locations where signs are to be placed, the type of mounting, and the type of finish.

(a) Sheet-metal signs to be placed on flat surfaces may be of any gage suitable for the type of finish to be applied.

(b) Sheet-metal signs to be placed on a post should be of 20-gage or heavier. It is recommended that 18-gage or heavier be used for signs

having an area of more than 4 square feet and/or with more than 12 inches overhang.

(c) Flanged sheet-metal signs to be placed at right angles to a wall or other placement may be made of lightweight metal provided the signs do not extend more than 6 inches from their supports. Twenty-gage sheet metal may be used for signs that do not extend more than 12 inches from their supports. Eighteen-gage or heavier metal should be used for signs extending more than 12 inches from their supports.

(d) The corners of all sheet-metal signs should be rounded and edges smoothed so as to avoid personal injury.

(e) United States Standard Gage for Sheet Steel

No. of Gage	Approximate Thickness in Fractions of An Inch	Approximate Thickness in Decimal Parts of an Inch	Weight Per Square Foot In Pounds Avoirdupois
14	5/64	.078125	3.1875
16	1/16	.0625	2.55
18	1/20	.05	2.04
20	3/80	.0375	1.53
22	1/32	.03125	1.275
26	3/160	.01875	.765
30	1/80	.0125	.51
38	1/160	.00625	.255

(f) The following finish for sheet-metal signs of 26 gage or heavier is recommended for outside or inside use where normal weathering or deteriorating elements exist. It is not recommended for use where unusual corrosive conditions exist which would cause rapid deterioration:

(1) The face of each sign should have at least one primer coat and two additional coats for the background color, and following the application of the last background coat the sign should be baked at the correct temperature and length of time best suited to the medium used for the background color. The baking temperature, rate of increase of temperature, and length of time of baking should be so controlled as to produce a tough, flexible coating, not visibly darkened and entirely free from cracks, shrinkage, wrinkles, blisters, and other blemishes. Separate baking of each background coat may be given, if desired. The back of each sign should receive at least one heavy coat of background color or aluminum paint. If aluminum paint is used, no baking is necessary for the back coat. The sign design and wording should be applied by a suitable device that will provide the equivalent of at least two wet coats and should be baked as recommended for the background color. The face of the finished sign may be given a coat of clear varnish, if desired. The paint both for background and design colors should be of the enamel or screen process enamel type, of a quality and character to permit of baking, and should pro-

duce a true color tone and a surface smooth, tough, and without cracks or other blemishes. The color tones, as indicated by reflected white light, should show dominant wave lengths as shown in the color specifications. (See Section 5, page 11.) Corrosion-resistant sheet metal is recommended.

(g) The following finish for sheet-metal signs is recommended for outside or inside use where normal weathering or deteriorating elements exist and where conditions exist that would cause unusual corrosion:

(1) The face of each sign should have a background finish or ground coat separately fused to the base metal. On this should be applied the succeeding coats necessary to produce the desired design. All coats should be so fused as to produce in the finished sign a single integral coat of enamel. The back and all edges of each sign should have at least one coat which may be fused at the same time the first face coat is fused, provided the base metal is covered so as to resist corrosion. The finished design should be clear-cut and sharp, the lines of all letters and details true, regular, and free from waviness, unevenness, furry edges, or lines, and from all cracking, scaling, pitting, blistering, or blemishes of any kind. Enamels used should be either a colored glass or should have a glass base or carrier with pigment in suspension, so compounded that upon fusion they will produce glass of the required color. Eighteen-gage special enameling sheets are most commonly used for this type of vitrified or porcelain enamel finish. The color tones should be governed by the color specifications. (See Section 5.) Mounting holes on all such signs should be provided with grommets.

(h) The following finishes are recommended for sheet-metal signs of 30-gage or lighter to be used inside where little or no deteriorating elements are encountered and for outside use where a limited time of exposure is contemplated:

(1) The face of each sign should have one primer coat and one additional coat for the background color. Baking after the last background

coat is optional. If baked, the baking operation should follow the same general procedure as previously outlined for sheet-metal finishes. The back of each sign should receive at least one coat of background color or aluminum paint. The sign design and wording should be applied by a suitable device and the finished design should be clear and sharp, the lines of all letters and details true, regular, and free from waviness, unevenness, furry edges, or lines and free from all cracking, scaling, pitting, blistering, or blemishes of any kind. The paint both for background and design colors should be of the enamel or screen process enamel type, of a quality and character to produce a true color tone, and a surface smooth, tough, and without cracks or other blemishes. The color tones should be governed by the color specifications. (See Section 5.)

(i) Sheet-metal signs finished by the lithograph process should closely follow the recommendations outlined in paragraph (h). The inks both for background and design colors should be of a quality and character to produce a true color tone and a surface smooth, tough, and without cracks or other blemishes. The color tones should be governed by the color specifications. (See Section 5.)

F2 WOOD SIGNS

(a) The wood used for signs should be yellow poplar, redwood, white pine, yellow pine, fir, cedar or cypress, kiln dried, grading one, face clear, other side free from wane, loose knots, or large pitch pockets. Wood signs should be made from one-inch stock surface on all sides and should have tongue and groove joints parallel with the grain of the wood. The grain should run in the direction of the longer overall dimensions of the finished sign. Wood signs should be reinforced with two battens securely fastened to each separate member.

(b) The following finish is recommended for outside or inside use where normal weathering or deteriorating elements exist. It is not recommended for use where unusual corrosive conditions exist which would cause rapid deterioration.

(1) The face of each sign should have at least one primer coat and two additional coats for the background color. Each coat should be thoroughly dried before the succeeding coat is applied. The finished background color should be smooth and free from brush marks, blisters, wrinkles or other blemishes. The back and all edges of each sign should receive a primer coat and one additional coat unless aluminum paint is used, in which case one coat is sufficient. The sign design or wording may be applied by hand or process. The finished design should be clear-cut and sharp, the lines of all letters and details true, regular, and free from waviness, unevenness, furry edges or lines, and from all cracking, scaling, pitting, blistering, or blemishes of any kind. The paint for background and design colors should be of a quality and character to produce a true color tone which will not change under exposure and a surface smooth, tough, and without cracks or other blemishes. The color tones should be governed by the color specifications. (See Section 5.)

F3 FIBRE SIGNS

(a) Fibre signs should be made of high-grade stock not less than $\frac{1}{8}$ inch thick. The finish for such signs should follow the recommendations given for the finish of light-weight sheet-metal signs. (See F1(h)) True color tones should be provided by the paint, ink, or medium used for the sign background and design. However, when the best grade of commercial white fibre stock is used it will not be necessary to apply a white background when the sign design to be used specifies a white background.

(b) Non-absorbent sheet fibre is recommended for electrical non-conductor signs. Non-metallic paints shall be used for the finish of such signs.

F4 PASTEBOARD, CLOTH, AND PAPER SIGNS

Signs made of these materials are recommended for temporary use only. Such signs are not of lasting quality and the sign design and wording is likely to become obliterated quickly. Color tones should be governed by color specifications. (See Section 5.)

F5 DECALCOMANIA AND PAINTED WALL SIGNS

Signs may be painted or pasted on existing walls or other surfaces. Such signs may consist of any material suitable to the type of sign, its location and usage, provided the finished sign meets the conditions of these specifications as to color. (See Section 5.)

F6 GLASS SIGNS

Signs made of glass, if located at a reasonable distance above the floor, particularly if mounted where they will not be struck by materials being handled, maintain attractiveness and usefulness for a long time. Laminated or tempered glass should be considered for such signs.

All glass signs should meet the conditions of these specifications as to color. (See Section 5.)

F7 ELECTRIC SIGNS

Signs using incandescent lamps or luminous tubes should meet the conditions of these specifications as to color. (See Section 5.)

F8 REFLECTING SIGNS

Signs made with all or part of the sign wording or message fitted with reflecting elements must have available a source of light to reflect the message. Such signs should conform to these specifications as to color. (See Section 5.)

F9 A final coat of clear varnish is recommended for all signs covered by F1(f), F1(h), F1(i), F2(b), F3, F4, and F5.

APPENDIX G SIGN LOCATIONS

G1 The selection of locations and positions of signs is important. A sign chosen to carry the required information should be so located that it is legible to all concerned.

G2 Generally signs should be placed slightly above eye level. Other levels, however, will be advisable at times.

G3 Signs should be placed sufficiently ahead of a particular hazard to allow anyone coming in view of the sign to have ample time to heed the warning before encountering the hazard. This distance will vary. For example, signs warning against the touching of switches or other electrical equipment should be placed close to the equipment; signs used in plant yards or on construction work should be placed sufficiently in advance of the danger zone to permit the warning to be perceived before the danger zone is reached.

G4 All signs should be so located that they do not create a hazard in themselves. Examples of such hazardous signs are those projecting into passageways at such heights that persons may strike against them.

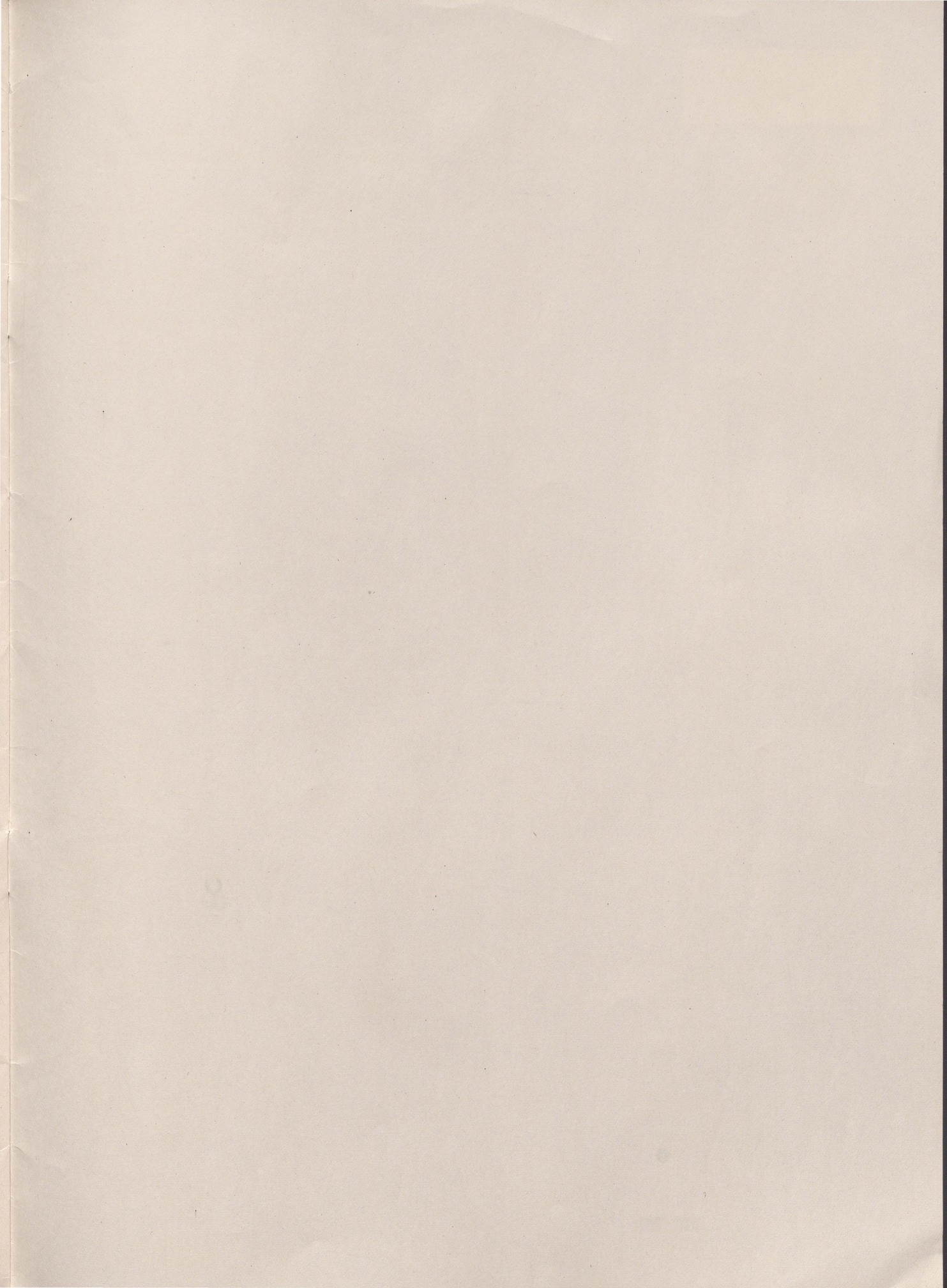
G5 All signs should be so located that they

will be readily visible. Ordinarily they should not be placed on movable objects, such as doors, windows, and racks, where a change in position would void the purpose of the sign. Where natural light is insufficient, artificial lighting should be supplied. Glare should be avoided.

G6 Signs should not be moved unless the changes in locations are beneficial to the purposes for which they were intended.

G7 Signs used to convey general information and safety thoughts may be placed at different locations from time to time, thereby renewing interest in the sign message, except as noted in Paragraph G6.

G8 All signs should be removed whenever the information they contain is no longer in effect. Such practice is especially important regarding signs which warn of specific temporary dangers. When the danger ceases to exist the sign warning against it should be removed promptly. For example, signs warning of men working above should be removed when the overhead job is completed. Failure to do this may induce disrespect for all signs.



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